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EXAMINER
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MOORE, IAN N

ART UNIT	PAPER NUMBER
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2661

DATE MAILED: 09/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/782,188

Applicant(s)

ERIKSSON ET AL.

Examiner

Ian N Moore

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>6/01, 11/01</u> . | 6) <input type="checkbox"/> Other: ____.  |

## DETAILED ACTION

### *Drawings*

1. Figure 1 and 2 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.121(d)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.
2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "**a plurality of cumulative metrics**" (claim 1, line 11 and claim 12, line 19-20) and "**a real path delay**" (claim 1, line 14) must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be

necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Objections***

3. Claim 12 is objected to because of the following informalities: claim 12 recites, "...**an apparatus** for estimating path delays experienced by a received signal, **the method** comprising..." Since claim 12 is the apparatus claim, thus it should be addressed as "the apparatus comprising". Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

**Claim 1** recites, "...using the corresponding one of the plurality of cumulative metrics to determine whether the hypothesized path delay corresponds to a real path delay..." in line 13-14. It is unclear what is "a plurality of cumulative metrics" and "a real path delay"? Does a plurality of cumulative metrics same as a real path delay? It is unclear

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between the method of determining whether the hypothesized path delay corresponds to a real path delay and the method using the corresponding one of the plurality of cumulative metrics to achieve such determination. Does the corresponding one of the plurality of cumulative metrics is compared against the hypothesized path delay?

**Claim 12** is also rejected for the same reason as stated above in claim 2.

**Claims 2-11 and 13-23** are also rejected since they depend on the rejected claims 1 and 12.

**Claim 2** recites, "...a real path delay ..." in line 19. It is unclear whether "a real path delay" recite in claim 2 the same as "a real path delay" recites in depended claim 1, line 14.

**Claims 3, 13, and 14** are also rejected for the same reason stated above in claim 2.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1,4-10,12, and 15-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miura (U.S. 6,333,934) in view of Sutton (U.S. 5,644,591).

**Regarding claims 1 and 12**, Miura'934 discloses an apparatus (see FIG. 1a, CDMA receiving apparatus) for estimating path delays experienced by a received signal (see FIG. 1a, a received signal A), the method comprising:

logic that hypothesizes a plurality of path delays (see FIG. 1a, a combined system of finger processing sections 1a to 1n and Synchronization detection and phase tracking section 4; note that the finger processing sections 1a to 1n are utilized for receiving signals from n paths, and the Synchronization detection and phase tracking section 4 assumes/hypothesizes path delay amount (i.e. phase displaced amount  $\pm d$ ,  $\pm 2d$ ,...) from n paths; see col. 6, lines 19-52);

logic that makes a measurement based on the received signal (see FIG. 1b, level measurement sections 9 (or 91-93) measures the path level for received signal A) for each of a plurality of measurement time slots (see FIG. 1a, signal A is the CDMA signal, and thus, it contains a plurality of channels each contains time slots; note that a level measurement sections measures a signal at each finger. A signal contains the time slots. Thus, measurement section 8 measures each of a plurality of time slots) and for each of the hypothesized path delays (see FIG. 1b; note that a level measurement sections measures a signal at each finger. The Synchronization detection and phase tracking section 4 assumes/hypothesizes the paths delay for each finger in de-spreading section 5, and the de-spreading section is outputted to measurement section 8. Thus, measurement section 8 measures for each of the assumed/hypothesizes path delay; see col. 6, lines 32-36; see col. 7, lines 1-12);

logic that uses the corresponding one of the plurality of cumulative metrics (see FIG. 1b, the selected magnitude delay level E from plurality of measurement sections 8; note that level comparison 10 compares the magnitude levels from the cumulative level measurement sections and selected the highest magnitude) to determine whether the hypothesized path

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delay (see FIG. 1b, the selected magnitude delay level E) corresponds to a real path delay (see FIG. 1b, one of the selected magnitude delay level D outputted by correlator 81-83 which forwards to detection circuit 13) for each of the plurality of hypothesized path delays (see FIG. 1b, Path change-over section 11; note that a path change-over section 11 uses the selected magnitude delay level E to determine whether the measured, compared and selected delay level corresponds to the respective delay magnitude level outputted by correlator, and selects the best/real path delay C produces by one of the finger; see col. 7, line 9-56).

Miura'934 does not explicitly disclose logic that determines whether a fade occurred; logic that combines the measurement with a corresponding one of a plurality of cumulative metrics only if it was determined that no fade occurred.

However, the above-mentioned claimed limitations are taught by Sutton'591. In particular, Sutton'591 teaches the logic that determines, for each of the plurality of measurement time slots (see FIG. 1, CDMA receiver 4 and despreader 6; note that the CDMA signal contains a plurality of channels each contains time slots; note that the receiver and despreader measures a pilot signal energy; see col. 3, lines 40-46) and for each of the hypothesized path delays (see FIG. 1, Searcher controller 18 provides hypothesis timing offsets/delay; see col. 3, lines 56-61), whether a fade occurred (see FIG. 1, Noncoherent combiner 14 determines whether the fade occurred by determining two clocks signals; see col. 4, lines 14-18);

logic that combines the measurement (see FIG. 1, squaring means 12;  $PN_I(n)$ , a real component I channel PN value) with a corresponding one of a plurality of cumulative metrics (see FIG. 1,  $PN_Q(n)$  an imaginary component Q channel PN value) for each of the plurality

of measurement time slots and for each of the hypothesized path delays only if it was determined that no fade occurred (see col. 4, line 7-24; note when the system determines, for each channels and timing offset/delay, that there is no deep fading, the squaring means 12 sum the I and Q energy signal; see equation 2).

Note that Miura'934 discloses the finger receivers, which determines, compares and selects the best delay value among each finger. Sutton'591 teaches the receiver which determines whether a fade occurs, and summing the real and imaginary values when where is no fading. Thus, Miura'934's finger receiver can be modified with Sutton'591's fading determination and combination PN values. In view of this, having the system of Miura'934 and then given the teaching of Sutton'591, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of Miura'934, by providing a mechanism of determining whether a fade occurred and sum measurement/real PN value with imaginary PN value only if it was determined that no fade occurred, as taught by Sutton'591. The motivation to combine is to obtain the advantages/benefits taught by Sutton'591 since Sutton'591 states at col. 2, line 5-41 that such modification would minimize the total time for acquisition by speeding up the search methodology, and provide a way to test the receiver by utilizing windows for hypotheses.

**Regarding claims 4 and 15**, the combined system of Miura'934 and Sutton'591 discloses wherein the logic that combines the measurement with the corresponding one of a plurality of cumulative metrics for each of the plurality of measurement time slots and for each of the hypothesized path delays only if it was determined that no fade occurred as

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described above in claim 1 and 12. Sutton'591 further discloses the logic that adds the measurement to the corresponding one of the plurality of cumulative metrics only if it was determined that no fade occurred (see col. 4, line 7-24; note when the system determines, for each channels and timing offset/delay, that there is no deep fading, the squaring means 12 sums or adds the I and Q energy signal; see equation 2).

In view of this, having the system of Miura'934 and then given the teaching of Sutton'591, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of Miura'934 as taught by Sutton'591, for the same purpose and motivation as stated above in claim 1 and 12.

**Regarding claims 5 and 16**, the combined system of Miura'934 and Sutton'591 discloses wherein the measurement based on the received signal for the hypothesized path delay for the measurement time slot as described above in claim 1 and 12. Miura'934 further discloses wherein the measurement based on the received signal is an amplitude measurement of the received signal (see FIG. 1b, magnitude level measurement sections 9 (or 91-93) measures the path magnitude/amplitude level for received signal A) at a time corresponding to the hypothesized path delay during the measurement time slot (see FIG. 1b, measurement section 8 measures the magnitude of the received signal which corresponds a path delay during a measuring time slot interval); see col. 6, lines 32-36; see col. 7, lines 1-12);

In view of this, having the system of Miura'934 and then given the teaching of Sutton'591, it would have been obvious to one having ordinary skill in the art at the time the

invention was made to modify the system of Miura'934 as taught by Sutton'591, for the same purpose and motivation as stated above in claim 1 and 12.

**Regarding claims 6, 7, 17 and 18**, the combined system of Miura'934 and Sutton'591 discloses wherein the measurement based on the received signal for the hypothesized path delay for the measurement time slot as described above in claim 1 and 12. Miura'934 further discloses wherein the measurement based on the received signal is an amplitude measurement of the received signal (see FIG. 1b, magnitude level measurement sections 9 (or 91-93) measures the path magnitude/amplitude level for received signal A) at a time corresponding to the hypothesized path delay during the measurement time slot (see FIG. 1b, measurement section 8 measures the magnitude of the received signal which corresponds a path delay during a measuring time slot interval); see col. 6, lines 32-36; see col. 7, lines 1-12).

Neither Miura'934 nor Sutton'591 explicitly discloses amplitude, absolute, a square of amplitude. Miura'934 teaches measuring the magnitude of the signal received at each finger in order to accurately define “real” or “scalar” value of the path delay. Measuring the amplitude, an absolute value of amplitude, a square of an absolute value of amplitude does not define a patentable distinct invention over that in the combined system of Miura'934 and Sutton'591 since both the invention as a whole and the combined system of Miura'934 and Sutton'591 are directed to measuring the magnitude value in order to accurately define “real” or “scalar” value of the path delay. The degree in which measuring the signal magnitude value presents no new or unexpected results, so long as the result is the magnitude value, and

the receiver processes such measured magnitude value in a successful way. If one utilizes to measure the magnitude, amplitude, absolute value of an amplitude, and a square of an absolute value of an amplitude, it will be provide same result of real, scalar magnitude value of the path delay. Therefore, to measure amplitude, absolute value of the amplitude, and a square of an absolute value of amplitude in order to determine the real magnitude value of the path delay would have been routine experimentation and optimization in the absence of criticality.

**Regarding claims 8 and 19**, the combined system of Miura'934 and Sutton'591 discloses wherein the logic that combines the measurement with the corresponding one of a plurality of cumulative metrics for each of the plurality of measurement time slots and for each of the hypothesized path delays only if it was determined that no fade occurred as described above in claim 1 and 12. Sutton'591 further discloses logic that coherently combining (see col. 4, line 7-24; note when the system determines, for each channels and timing offset/delay, that there is no deep fading, the squaring means 12 reasonably/consistently/coherently sums or adds the I and Q energy signal from coherent accumulators 8 and 10).

In view of this, having the system of Miura'934 and then given the teaching of Sutton'591, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of Miura'934 as taught by Sutton'591, for the same purpose and motivation as stated above in claim 1 and 12.

**Regarding claims 9 and 20**, the combined system of Miura'934 and Sutton'591 discloses wherein the logic that combines the measurement with the corresponding one of a plurality of cumulative metrics for each of the plurality of measurement time slots and for each of the hypothesized path delays only if it was determined that no fade occurred as described above in claim 1 and 12. Sutton'591 further discloses logic that combining (see col. 4, line 7-24; note when the system determines, for each channels and timing offset/delay, that there is no deep fading, the squaring means 12 sums or adds the I and Q energy signal from coherent accumulators 8 and 10). Sutton'591 further discloses a non-coherent accumulator 14 which received the summed signal from the squaring means 12. Thus, the combined system of squaring means 12 and non-coherent accumulator 14 non-coherently combines the measurement.

In view of this, having the system of Miura'934 and then given the teaching of Sutton'591, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of Miura'934 as taught by Sutton'591, for the same purpose and motivation as stated above in claim 1 and 12.

**Regarding claims 10,21 and 22**, the combined system of Miura'934 and Sutton'591 discloses the logic that determines the real path delays as described above in claim 1 and 12. Miura'934 further discloses supplying a real path delay (see FIG. 1b, the best/real path delay C) to RAKE receiver circuitry (see FIG. 1a, Rake composition section 2) for use in receiving the received signal (see col. 7, lines 15-43).

In view of this, having the system of Miura'934 and then given the teaching of Sutton'591, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of Miura'934 as taught by Sutton'591, for the same purpose and motivation as stated above in claim 1 and 12.

6. Claims 2,3,13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miura'934 and Sutton'591, as applied to claim 1 and 12 above, and further in view of Baltersee (U.S. 2002/0037028A1).

**Regarding claims 2, 3, 13 and 14**, the combined system of Miura'934 and Sutton'591 discloses logic that combines the measurement with an cumulative metric whenever it is determined that no fades occurred for any of the hypothesized path delays for each of the plurality of measurement time slots as described above in claims 1 and 12.

Neither Miura'934 nor Sutton'591 explicitly discloses an additional cumulative metric (see Baltersee'028 FIG. 2, timing error detector 102), logic that uses the additional cumulative metric to determine whether a real path delay (see Sutton'591 FIG. 2, step 125, the delay where difference early and late estimate from step 124 is closed to zero) exists between two of the path delays (see Baltersee'028 FIG. 2, late delay estimate 113 and early delay estimate 114; note that the timing error detector determines a real path delay between early and late delay estimates; see Baltersee'028 page 3, paragraph 36).

However, the above-mentioned claimed limitations are taught by Baltersee'028. In view of this, having the combined system of Miura'934 and Sutton'591, then given the teaching of Baltersee'028, it would have been obvious to one having ordinary skill in the art

at the time the invention was made to modify the combined system of Miura'934 and Sutton'591, by providing an additional cumulative metric to determine the path delay between late delay estimate and early delay estimate, as taught by Baltersee'028. The motivation to combine is to obtain the advantages/benefits taught by Baltersee'028 since Baltersee'028 states at page 1-2, paragraph 11-18 that such modification would provide a CDMA receiver with low complexity and cost, improve performance, synchronizing fingers and thereby reducing the interference.

7. Claims 11 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miura'934 and Sutton'591, as applied to claim 1 and 12 above, and further in view of Qiu (U.S. 2002/0097686A1).

**Regarding claims 11 and 23**, the combined system of Miura'934 and Sutton'591 discloses wherein the logic that determines, for each of the plurality of measurement time slots and for each of the hypothesized path delays, whether a fade occurred as described above in claims 1 and 12.

Neither Miura'934 nor Sutton'591 explicitly discloses logic that uses one or more previously determined channel estimates to determine whether a fade occurred (see Qiu'686 FIG. 3, FAU, Fading Adaptive Unit; note that FAU determines the previous channels estimation in order to predict fading; see Qiu'686 page 2, paragraph 22,29 and see page 4, paragraph 46).

However, the above-mentioned claimed limitations are taught by Qiu'686. In view of this, having the combined system of Miura'934 and Sutton'591, then given the teaching of


Qiu'686, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the combined system of Miura'934 and Sutton'591, by providing FAU that determines previous channels estimations in order to predict fading, as taught by Qiu'686. The motivation to combine is to obtain the advantages/benefits taught by Qiu'686 since Qiu'686 states at page 1, paragraph 5-6, 11-13 that such modification would provide an adaptive system which supports higher peak data rate and throughput in digital wireless communication, and provide the adaptive transmission in the radio frequency fading channel to improve the system capacity.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ian N Moore whose telephone number is 571-272-3085. The examiner can normally be reached on M-F: 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Vanderpuye can be reached on 571-272-3078. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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9/9/04

  
BRIAN NGUYEN  
PRIMARY EXAMINER 9/13/04